CLAIMS

1. An optimum shape design method characterized in that, while a mechanical response amount including at least one of the maximum deceleration and the maximum displacement generated in contents in drop impact and creep displacement generated in long-term use of a cushioning material is detected with respect to a cushioning material shape defined as cushioning material CAD data produced based on design data of said cushioning material used in cushioning packaging, manufacturing decision for said cushioning material shape defined as the CAD data is detected,

a correlation among said cushioning material CAD data, said mechanical response amount, and said manufacturing decision is detected,

said cushioning material CAD data is changed until an optimum shape of said cushioning material is detected based on said correlation, said mechanical response amount satisfying design conditions of said cushioning material and said cushioning material being producible in the optimum shape, and

the correlation among said cushioning material CAD data, said mechanical response amount, and said manufacturing decision is updated based on said changed cushioning material CAD data, and the optimum shape of said cushioning material is detected based on the updated correlation, said mechanical response amount satisfying design conditions of said cushioning material and said cushioning material being producible in the optimum shape.

2. An optimum shape design method characterized in that, a mechanical response amount including at least one of the maximum

deceleration and the maximum displacement generated in contents in drop impact and creep displacement generated in long-term use of a cushioning material is detected with respect to a cushioning material shape defined as cushioning material CAD data produced based on design data of said cushioning material used in cushioning packaging, manufacturing decision for said cushioning material shape defined as the CAD data is detected, and manufacturing cost is detected with respect to said cushioning material shape defined as the CAD data,

a correlation among said cushioning material CAD data, said mechanical response amount, said manufacturing decision, and said manufacturing cost is detected,

said cushioning material CAD data is changed until an optimum shape of said cushioning material is detected based on said correlation, said mechanical response amount satisfying design conditions of said cushioning material, said cushioning material being producible, and minimum manufacturing cost being obtained in the optimum shape, and

the correlation among said cushioning material CAD data, said mechanical response amount, said manufacturing decision, and said manufacturing cost is updated based on said changed cushioning material CAD data, and the optimum shape of said cushioning material is detected based on the updated correlation, said mechanical response amount satisfying design conditions of said cushioning material, said cushioning material being producible, and the minimum manufacturing cost being obtained in the optimum shape.

3. The optimum shape design method according to claims 1 or 2, characterized in that said cushioning material is an item manufactured by using a molding die, and the manufacturing decision is detected such that outer circumferences of cross-sectional shapes of cross sections, divided by a plurality of planes perpendicular to an extraction direction in releasing the item and the molding die from each other do not intersect one another when the outer circumferences are projected from the extraction direction.

4. An optimum shape design system characterized by including:

input means for inputting design data of a cushioning material used in cushioning packaging;

CAD means for defining a cushioning material shape based on the cushioning material design data inputted by said input means;

mechanical response amount calculation means for detecting a mechanical response amount for said cushioning material shape defined by the CAD means, the mechanical response amount including at least one of the maximum deceleration and the maximum displacement generated in contents and creep displacement generated in long-term use of said cushioning material;

manufacturing decision detection means for detecting manufacturing decision for said cushioning material shape defined by the CAD means;

optimizing control means for detecting a correlation among said cushioning material CAD data defined by the CAD means, said

mechanical response amount detected by the mechanical response amount calculation means, and said manufacturing decision information detected by the manufacturing decision detection means, the optimizing control means changing said cushioning material CAD data until said cushioning material optimum shape is detected based on the correlation, said mechanical response amount satisfying design conditions of said cushioning material and said cushioning material being producible in the optimum shape, the optimizing control means updating the correlation among the cushioning material CAD data, said mechanical response amount, and said manufacturing decision based on said changed cushioning material CAD data, the optimizing control means detecting said cushioning material optimum shape based on the updated correlation, said mechanical response amount satisfying design conditions of said cushioning material and said cushioning material being producible in the optimum shape;

display means for outputting and displaying said cushioning material optimum shape detected by said optimizing control means.

5. An optimum shape design system characterized by including:

input means for inputting design data of a cushioning material used in cushioning packaging;

CAD means for defining a cushioning material shape based on the cushioning material design data inputted by said input means;

mechanical response amount calculation means for detecting a mechanical response amount for said cushioning

material shape defined by the CAD means, the mechanical response amount including at least one of the maximum deceleration and the maximum displacement generated in contents and creep displacement generated in long-term use of said cushioning material;

manufacturing decision detection means for detecting manufacturing decision for said cushioning material shape defined by the CAD means;

cost calculation means for detecting manufacturing cost for said cushioning material shape defined by the CAD means;

optimizing control means for detecting a correlation among said cushioning material CAD data defined by the CAD means, said mechanical response amount detected by the mechanical response amount calculation means, said manufacturing decision information detected by the manufacturing decision detection means, and said manufacturing cost information detected by the cost calculation means, the optimizing control means updating said cushioning material CAD data until said cushioning material optimum shape is detected based on the correlation, said mechanical response amount satisfying design conditions of said cushioning material, said cushioning material being producible, and minimum manufacturing cost being obtained in the optimum shape, the optimizing control means updating the correlation among the cushioning material CAD data, said mechanical response amount, said manufacturing decision, and said manufacturing cost based on said changed cushioning material CAD data, the optimizing control means detecting said cushioning material

optimum shape based on the updated correlation, said mechanical response amount satisfying design conditions of said cushioning material, said cushioning material being producible, and the minimum manufacturing cost being obtained in the optimum shape;

display means for outputting and displaying said cushioning material optimum shape detected by said optimizing control means.

6. The optimum shape design system according to claims 4 or 5, characterized in that said cushioning material is an item manufactured by using a molding die, and the manufacturing decision is detected such that outer circumferences of cross-sectional shapes of cross sections, divided by a plurality of planes perpendicular to an extraction direction in releasing the item and the molding die from each other do not intersect one another when the outer circumferences are projected from the extraction direction.